JPRS 84936

13 December 1983

West Europe Report

SCIENCE AND TECHNOLOGY

No. 169

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 84936

13 December 1983

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

No. 169

CONTENTS

SWEDISH METALLURGY TECHNOLOGY FOR SEAMLESS PIPES

Stockholm NY TEKNIK in Swedish 3 Nov 83 pp 34-35

[Article by Jan Lothigus: "Powder Metallurgy - Sweden Is First With Seamless Stainless Pipe"]

> [Text] Nyby Uddeholm Powder in Torshalla recently received its first order for pipe flanges made of pressed stainless steel powder for Norwegian oil platforms. The firm is the world's largest manufacturer of high alloy steel powder, and was the first in the world to manufacture stainless pipes with powder as the original material.

"We have succeeded in introducing an entirely new quality into the conservative and quality-conscious oil industry," said Torbjorn Andersson, who is responsible for the development of hot isostatic pressed components at Nyby Uddeholm Powder.

"In the powder-based materials we have been able to combine good weldability with good resistance to corrosion. In traditional materials those used to be conflicting properties," said Torbjorn Andersson.

The pressed-powder flanges and other components are manufactured in several different steps.

First a mould is made of common steel plate which is formed and welded together into a tight pot. The pot, which is a little larger than the final product, is tested for leaks before it is filled with steel powder through a filling pipe which is welded on.

The powder is vibrated so that the mould is completely full, after which the filling pipe is cut off and the hole is welded closed.

High Pressure

Then the powder-filled mould is put into a press which applies a very high isostatic pressure (the same from all directions). At 500 MPa, 5,000 times

atmospheric pressure, the powder is compressed from 70 to 85-90 percent of final steel density. The press uses water as the pressure medium.

The next step in manufacture is hot isostatic pressing. The heated subject is pressed together into an entirely compact steel structure. Argon is used as a pressure medium. Finally the mould is removed and the piece is worked into its final form.

Hot isostatic forming gives very little waste of material, since the pressed substance is near to its final form. Furthermore it is possible to fabricate very large components with powder. Some of the flanges are about one meter in diameter.

Pressed powder components can also be made into forms which can not be made by forging, for example.

One Piece - Two Materials

Different types of powder can be put together in a single piece. For example Nyby Uddeholm Powder has manufactured short sections of pipe which are high-alloy steel at one end, and low-alloy steel at the other end.

Such sections of pipe are used as extension pieces between pipe of different materials which are to be welded together. In that way the welding of different materials together is avoided, as it is difficult to do well. It is also used to provide exposed machine parts with wearing surfaces of some suitable alloy.

Spherical Powder

The original material for the pipe flanges is spherical steel powder, which is also made by the Torshalla firm.

The powder is formed by using a buffer gas (protected against the oxygen of the air) to blow apart a jet of molten steel. The buffer gas is argon or nitrogen, depending on the type of steel. The steel drops fall freely in a tower 15 meters high. When the drops reach the bottom they have solidified. Then the powder cools in a buffer gas atmosphere.

In the most common method of manufacturing powder, the steel drops are cooled in water, which gives the seeds of the powder a more irregular shape and a higher oxide content. According to Nyby Uddeholm Powder the spherical powder with low oxide content gives the best quality in the final product.

The bloom of steel is prepared in a five-ton industion oven, which is rather large when related to powder metallurgy.

"Large ovens make it better to use modern steel fabricating techniques effectively," explained production chief Claes Tornberg.

Large Pipe Manufacture

Most of the approximately 6,000 tons of powder which will be made this year will be used for fabricating pipe, while a smaller amount will be sold as powder. It is mostly used for such things as surfacing of worn machinery parts. One hundred tons of powder will be used in the firm's own manufacture of hot isostatic pressed parts.

The seamless pipe is made by hot extruding of powder-based substances. It is manufactured in basically the same way as the parts in hot isostatic pressing.

The pieces will be shaped like coarse pipes. Therefore the mould is made of two pipes, one smaller than the other, which are welded together top and bottom. The mould is tested for leaks, filled with steel powder, sealed and isostatically pressed cold. Before pressing the moulds are a little plump, in order to come out of the press shorter and more slender.

Hot Extruding

The piece is heated in two stages before it is put into the extruding press. There the glowing piece is put under very high pressure between the tool and the arbor, until the desired dimension is attained. Heat and high pressure give the steel an entirely compact structure.

When the pipe cools the remainder of the mould is removed by pickling in sulfuric acid. The pipe goes to inspection and finishing.

Before 1980 when seamless pipe was first fabricated of powder, pipe was extruded from solid substance. This required many manufacturing steps. first a billet had to be cast, later rolled, cut into lengths and bored out. In comparison the powder technique gives less waste of original material, and about half the energy consumption. Powder-based pipe has equal or better quality.

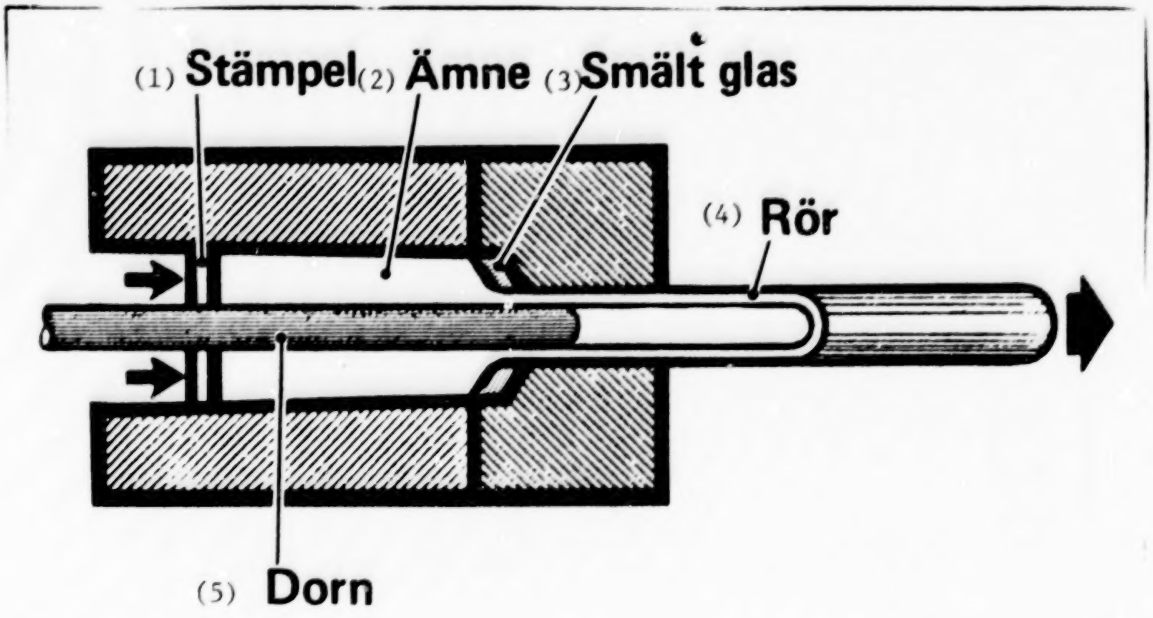
French Pipe License

Until just recently Nyby Uddeholm Powder was the only manufacturer of powder-based pipe in the world. Now a large French pipe manufacturer has acquired license rights to this method of pipe manufacture, which was developed by Nyby Uddeholm in cooperation with Asea.

"The future looks bright for powder metallurgy," said Managing Director Christer Aslund. "The sale of pipe will hardly be larger than last year, but the sale of powder is continually growing. More and more powder will be going to manufacturers of hot isostatic pressed components," said Christer Aslund.

Nyby Uddeholm Powder was recently granted a development loan from the Industrial Fund of "more than 5 million kronor" (Christer Aslund will not be more precise than that as to the amount). The money will be used to develop new powder alloys of such quality that cannot be made by today's techniques.

"We are going to lead developments in powder metallurgy, I am convinced of that," concluded Christer Aslund.



Key: 1. Plunger
2. Billet
3. Molten glass
4. Pipe
5. Arbor

Caption: This is how pipe is extruded. The heated hollow billet is pressed with great pressure into the tool. It is forced into the form of a pipe between the fixed arbor and the tapering shape of the tool. The glass acts as a lubricant between the billet and the tool.

9287
CSO: 3698/131

AEROSPACE

HIGH COST, LACK OF INTEREST, MONEY FOR SPACELAB LAUNCHES

Stuttgart FLUG REVUE in German Nov 83 p 22

[Article by Goetz Wange: "Journal: Free Start for Spacelab--Laboratory for 1.7 Billion: Europeans Climbing Hand-Over-Hand"]

> [Text] Europe has paid a lot of money for its apprenticeship; the entrance ticket to manned space flight was expensive. Incautious negotiating with the United States pushed the price high.

The European astronautics industry has every reason for jubilation: with the space laboratory Spacelab Europe is for the first time making a substantial technological contribution to manned space flight. But after the first operation things will be seen in a more sober light. For each subsequent use of their laboratory the Europeans will have to reach deep into their pockets. This is also true of the flights of those ESA member countries which helped to finance the development of Spacelab with about 1.7 billion marks. The FRG is especially hard hit by this. At a ratio of 55 percent it contributed the major portion of the development costs. Now in gratitude for this Germany will have to pay another 125 million marks if it wants to use the space laboratory in 1985 for its own national mission D-1. It is at this expensive rate that NASA is requiring payment for the shuttle launch and for Spacelab rent.

But the contracts were concluded when the coffers of the European countries were still full. According to these contracts the ESA obtains free launching service only at the Spacelab premiere. In addition, NASA is receiving the expensive European investment of work as a gift.

All too incautiously the Europeans had given out the trumps in their hands when the agreements were originally entered into. Thus in 1969 the ESRO accepted with pride the invitation to joint development of a recoverable reusable space transport system. It was hoped that in partnership with NASA it would be possible to overcome those reverses which European space flight had experienced, particularly in the construction of its own launching rockets.

While the United States was undertaking the development of the space shuttle the European Conference of Ministers of Science came to an agreement in 1972

that the development of a manned space laboratory would be an appropriate European contribution.

Over 50 industrial partners began in 1974 under the leadership of the Bremen astronautics company ERNO with the realization of this ambitious project. With the exception of Ireland and Sweden all member states of the ESA contributed to the Spacelab program. In addition, Austria was also a participant with the status of an associate ESA member.

Because inside the laboratory housing (the module) science-astronauts will work without a spacesuit the Spacelab development imposed heavy demands upon the European astronautics industry which had had experience only in the construction of unmanned satellites. The engineers began to receive praise for their work when in 1980 they delivered the prototype and 1 year later the flight unit to NASA. But they will not really be satisfied until the space laboratory has successfully performed its maiden flight. Then it will be necessary to hear more than anything else the voices of those 219 scientists from 16 countries who are participating in this mission.

Most of the experiment ideas were born in the laboratories of the universities or of special research institutes. At the moment names from industry such as the German firm of Krupp and MAN are still the exception. This also applies to America. Paying customers like the McDonnell-Douglas Company which has already had its electrophoresis experiment carried on three shuttle flights are also rare in the United States. In this particular case the users are expected to be in the pharmaceutical industry, to which the special process for separating biological and chemical substances is being offered.

Europe Lacks Money for Further Flights

In Europe there is a hope that Spacelab will over the long term pay for itself through the results which it achieves. Therefore the FRG has booked a further Spacelab flight to demonstrate the existing possibilities. With the D-1 mission Germany stands at the head of the list of bookings as the thus far greatest shuttle customer.

Otherwise the laboratory will be used in three American flights up until 1985; three further missions are being planned for 1987/1988. Future joint European missions within the framework of the ESA have thus far failed to emerge both because of insufficient interest on the part of the member countries and also because of a lack of money. Nevertheless, the FRG has taken an option for a further flight (D-4) involving primary experiments in the domain of astronomy. Whether there will be a 1987 flight as planned depends naturally upon its financial feasibility, but also it depends upon the success of the first Spacelab mission.

8008
CSO: 3698/111

DANISH CRYSTAL-GROWTH EXPERIMENT ABOARD SPACELAB

Copenhagen BERLINGSKE TIDENDE in Danish 10 Nov 83 p 6

[Article by Michael Rastrup Smith]

[Text] Danish science and industry will be in the forefront when the American spaceship "Challenger" goes into orbit at the end of the month. In its cargo it will carry the joint European space laboratory, Spacelab. An exciting Danish experiment is included in Spacelab. Danish scientists will go into space next year too--financed by Simon Spies.

Five-four-three-two-one. Zero! Denmark's Technical College will go into space on 28 November.

Block 309--Physics Laboratory 3--it says on the door. Behind the door is one of Denmark's most exciting scientific projects: "Crystal cultivation in space."

For 10 years scientists at Denmark's Technical College (DTH) have grown crystals. The crystals form if one allows two liquids to flow against each other. This process is a common routine in the laboratory in Lyngby. Crystals formed in this way grow quickly and unchecked. However it is believed that the same crystals would grow more slowly but in a controlled way out in space, because of lack of gravity.

This will be demonstrated when the European space laboratory, Spacelab, goes into space with the American space shuttle "Challenger" at the end of the month.

The Danish participation in the space flight is a textbook example that Danish research can be of an international caliber. At the same time it is a good example of what cooperation between scientists and industry can lead to.

The Physics Laboratory's crystals are grown in boxes that maintain a constant temperature of 40° C. Here is where industry comes in in the form of the electronics firm of Terma in Arhus. In cooperation with the scientists at DTH they have produced a thermostatically-controlled heater that can keep the "crystal factory" at the correct temperature out in space.

Countdown Begun

At this time the countdown for the Spacelab experiment has already begun in the laboratory at Denmark's Technical College. There are sweat-covered brows and nervous expressions. The planned space trip on 28 November is the third attempt to get Spacelab into space. The first time was on 28 September. Technical problems delayed the trip until 28 October.

That date was almost fatal for the crew. Veteran captain John Young and his five-man crew were 8 seconds away from death when a booster almost burned into the fuel tank of the space ship's rockets.

"Space research calls for a lot of patience," said civil engineer Georg Galster from the Danish crystal project. "When the space ship hopefully goes up at the end of the month we will have waited 10 years to get into space. It is that long since we got the go-ahead and funds from the Education Ministry's space committee to start our special research."

The DTH project will be the first Danish experiment to go out on an American space ship. The European Space Association, ESA, which has its headquarters in Paris, decided at one time to build a space laboratory that could fit into the cargo space of the American space ships. Denmark put around 50 million kroner into the project.

On 28 November the first space laboratory will go up. The big European ESA countries, Germany and France, dominate the projects in the laboratory. As a joint scientific representative, they are sending German Ulf Merbold into space with the laboratory.

"He will not be kept busy because of our experiment. All he has to do is push a button that starts it running. After that it will run by itself, thanks to the automatic system Terma has sealed the experiment in," said civil engineer Georg Galster.

Along with his scientific colleagues he is eagerly waiting to see what comes out of the attempt to produce crystals under controls in space. In the joint American-Soviet space project, Apollo-Soyuz, an American scientist tried to grow crystals in space. The experiment confirmed the theory that crystals grow better in space but it suffered from not having a heater that could hold it at a constant temperature.

They have gone farther in the Danish experiment. They are trying to do two things at once, in that they are studying the "growth conditions" for

the crystals as well as their ability to conduct electric current. The Danish scientists namely have a theory that the form of crystals they are growing will be much better conductors when they are grown in space.

"We are concerned with basic research. This means that we are not trying to grow crystals that have special conductive properties because they are to be used for something definite. We are trying to form a clear idea of the properties of the crystals; not until these are known will we be able to think of a real use for them," said Georg Galster.

Funded by Spies

In Terma's thermostatically-controlled heater, the Danish "crystal factory" will share the room with a similar experiment from France. In contrast to the Danish project, the French experiment is aimed simply at studying crystals' ability to grow in space.

But Denmark's Technical College will not be through in space when the space shuttle lands with Spacelab in early December. The American space organization, NASA, has offered the Danish scientists room in the purely American space program, LDEF [expansion unknown], that will go up with the space shuttle next year. Terma will provide some even larger heaters in which DTH will share room with a crystal experiment that is being conducted by the American giant concern of Rockwell, which builds the space shuttles. This Danish experiment is being financed by the Danish Space Society, which is owned by the travel king, Simon Spies, who will thus come one step closer to his desire to own his own satellite, which he referred to earlier.

At the moment DTH is asking the Danish space committee for funds to participate in the joint European satellite, Eurika, which will be launched in the late 1980's.

"By then we will have the results from the first two experiments analyzed fairly completely and we will be able to take part in a more advanced program. But of course we also want to be part of this in order to keep Danish space research in close contact with the international connections we have acquired. Finally I would like to mention the importance the experiments have had for Danish industry. Terma electronics through its cooperation with Danish scientists has further developed its space expertise and at the same time we have learned an incredible amount from the cooperation," said civil engineer Georg Galster.

It is now obvious that the industrial-scientific cooperation has borne results. While DTH still does not know if they can be included in the Eurika program, Terma has received an order for an enormous thermostatically-controlled heater with room for 12 experiments from the European space. organization in Paris.

6578
CSO: 3698/110

AUTOMOBILE INDUSTRY

DAIMLER-BENZ 1983 PASSENGER CAR SALES, INVESTMENTS

Duesseldorf HANDELSBLATT in German 28/29 Oct 83 p 17

[Text] HANDELSBLATT, Thursday, 27 Oct 83. gh Stuttgart. The figures for the first three quarters of 1983 show enormous shifts in the Daimler-Benz firm compared to the course of the year 1982. If in 1982, just as already in the previous year, the foreign business had carried the sales, it was just the other way around in 1983.

If the exports of Daimler-Benz, Inc. had still increased by 15 percent in 1982, it decreased by 6 percent during the first 9 months of 1983. Domestic sales, by contrast, which in 1982 had decreased by 1.5 percent, increased in 1983 by 17 percent. The share of exports in total sales of the corporation, which increased by 4 (1982 by 7) percent to DM 23.7 billion, decreased from 57.3 percent to 51.8 percent. Both in the case of passenger cars and commercial vehicles, as in the entire industry, there was a shift to the domestic market.

No Increase Even in Exports

In the foreign business it was, above all, the reduction in the demand for heavy trucks from the countries of the Near and Middle East which had a disadvantageous effect. The sales of the combine are, beyond this, negatively affected by the continuing difficult situation in Brazil, so that, as it is stated in a letter to shareholders, the production of trucks and buses had to be reduced once again.

It was reported that in the case of the subsidiary company Euclid (extra-heavy trucks) in the United States no improvement has as yet developed. However, the other U.S. subsidiary, Freightliner, was able to increase the sale of heavy trucks. In response to a question, a speaker of the enterprise said that economic prospects in the United States have improved. In Argentina it was possible to stabilize business activity--albeit at a low level.

In terms of the sales of the combine, this had the effect that the increase with only 2 percent to DM 29.2 billion turned out to be relatively low (in 1982 the sales of the combine had still increased by 6.1 percent to DM 28.7 billion). At the same time, passenger car sales during the first 9 months

were able to register an increase of 14 percent, while the sales of commercial vehicles (it is not stated) decreased by an estimated 7-10 percent.

In the passenger car division the domestic sales of Daimler-Benz increased by 8 percent in the first 9 months, and in exports--contrary to the development in the industry (-5 percent)--an increase of 3 percent could be registered. In so doing, as transpires from the letter to shareholders, there was once again a shift to higher-grade cars.

Passenger car production, it is anticipated, will probably reach more than 470,000 units in 1983 (last year 458,345), in the S- and S-Special Class, a new high in production will be reached with 114,000 units, in the course of which the share of 8-cylinder motors will increase to almost 50 percent.

Of the new model series 190, 109,000 units are to be produced during the initial year of production. Their production--a matter of capacity--to a large extent still goes at the expense of the medium-class models. A higher production, corresponding to the situation with respect to orders, it is reported, will be possible only after the start-up of the new plant in Bremen. How many 190-models can be produced in 1984 in Bremen is something the speaker of the enterprise refused to talk about. The production in Bremen, he indicated, is to get underway at the beginning of 1984 and during the year reach the capacity of 45,000 to 50,000 cars.

No Data on the Profit and Loss Position

According to the letter to shareholders, Daimler-Benz will reach more than DM 3 billion in real investments in the combine. Nothing at all is said in the letter to shareholders about the profit and loss situation. The shareholder will also be hardpressed to receive any indication between the lines that would permit an interpretation of the Daimler share boom for internal enterprise reasons.

The letter to shareholders rather conveys the impression that the difficult times, especially in terms of the commercial vehicle markets, also do not leave Daimler-Benz unaffected. With an overall smaller growth, enormous shifts in the sales categories have had to be managed. The production in the Mercedes truck program had to be curtailed. Although in the case of pick-up trucks and buses it could be increased slightly, it will not be possible to attain the unit figures of 1982 in the commercial vehicle division.

[illegible]
[illegible]

BIOTECHNOLOGY

FRENCH SOLAR BIOTECH CENTER IN CADARACHE

Paris LE MONDE in French 21 Sep 83 p 16

[Article by Jean-Francois Aufereau: 'Microalgae: A New Mine of Raw Materials']

[Text] It looks like a plumber's nightmare, with its tens of meters of piping, its suction and exhaust pumps, its faucets and flow regulators that aren't operating yet, but could. Actually, it is no such thing, even though the water flowing through the transparent pipes is slightly off-color, as if the plant had been shut down for quite a while. Nothing seems to be happening. Everything looks quite ordinary and yet -- the microalgae are hard at work, silently -- or as near as no matter -- tickled into action by sunlight or by lamps that provide artificial daylight. Somewhere down there, greenish microalgae -- Botyrococcus braunii -- are turning out a blend of three different hydrocarbons; a little further on, we find red microalgae --- Porphydidium cruentum -- busily manufacturing a pricey substance which possesses the qualities of certain thickening agents widely used in the food-processing industry. For the time being, these are nothing more than laboratory findings, but tomorrow, if thes· technologies ever reach the industry level, won't we be seeing a proliferation of a new kind of farm?

In the Solar Biotechnology laboratories at the Cadarache Center for Nuclear Studies (Bouches-du-Rhône), where these experiments are under way, these microalgae are engaged in what is, for them, the oldest profession in the world: photosynthesis. What is actually happening is that the microscopic plants use the photons of solar radiation to fuel their own development and growth, by transforming the incoming energy into chemical energy. And so, using a soupcon of water, a pinch of carbon dioxide, and a beam of energy from the sun, this vegetation can synthesize a whole range of highly complex chemical reactions, which, all together, add up to photosynthesis. This new form of energy is then used in either of two ways: some of it goes to sustain the plants, and some of it provides the material and energy to manufacture such plant constituent elements as lignine (xylogen) and cellulose. How could one avoid, given these conditions, considering

channeling the process to our advantage in order to derive industrially profitable compounds from it?

Two Ways To Go

For all of these reasons, the research people have come to the conclusion that priority has to go to direct bioconversion, by which they mean the whole body of processes by means of which the clorophyll-containing cell transforms the visible segment of sunshine into products which are chemically stable and possibly of use to industry. There are two ways to go, since direct bioconversion involves two kinds of photoconverters:

-- evolved vegetation, which covers the land surfaces of the earth and, by extension, the macroscopic algae, which have been harvested for millennia; or

-- the simple photosynthetic systems, natural or artificial. It is in the first of these categories that we find the photosynthetic bacteria, the cyanobacteria, which can fix atmospheric nitrogenand synthesize ammonia, and the microalgae, which we expect to manufacture such highly profitable commodities as hydrocarbons, polysaccharides, glycerol, starch, pigments, etc.

The Aztecs Did It ...

Although research in this kingdom of microalgae is still in the embryonic state by comparison with other research fields, honesty compels one to admit that, for half a century, there has been a varying degree of interest in the potential of cultivating microalgae. There is one compelling drive behind that interest, and, as Mr Claude Gudin, of the Solar Biotechnology Laboratory, explains, it stems "from the extraordinary ability of these tiny organisms, only a few tens of microns in size, to grow with extreme rapidity when environmental conditions are favorable." The time required to double available biomass ranges from 12 hours for Porphyridium cruentum to 48 hours for Botryococcus braunii. Both these algae produce chemical compounds.

Such capacities naturally led researchers to try growing the microalgae in outdoor installations such as artificial basins, lakes, ponds, or lagoons, more or less carefully designed. In Mexico, for instance, they are working with protein-rich algae known as Spirulinas, and Sosa Texcoco is growing them on a 500-hectare farm; much the same sort of experiment is under way in Chad.

The French Petroleum Institute (IFP) is also conducting experiments on a cooperative basis in Martinique, in Egypt, and in Japan.

While the operation conducted with Spirulina as run in Mexico is well within the folk tradition of the practices of Aztec people or those of the Kanem region in Chad, the ones the IFP is contemplating are something else again. What its target is has to do

not so much with producing proteins as with extracting food colorings such as zeaxanthine (yellow), myxoxanthophyll (red-orange), and phycocyanine (blue). Another example, this one from Israel: On the basis of experimental work by M.A.B. Amotz, Koor Foods, Ltd. has built a pilot plant to produce glycerol; it covers 450 square meters, and the company is considering building a 200-hectare installation that would enable it to produce -- some say this figure is pretty high -- 100,000 tons per year from the Dunalellia parva algae. One more example: in Japan, they are growing Chlorella in basins for use as food.

There is, of course, another side to the coin. Such outdoor operations are not really controlled, as they could be with industrial-style systems where each production parameter would be constantly optimized. Without such control capacity, any significant economic return on such operations would be fairly difficult to insure.

Return on Investment

"Whether you're growing microalgae, photosynthesizing bacteria, or macroalgae, and whether you're doing it under sophisticated factory conditions or in an open-air pond, the retail price of the dried harvested material was somewhere between 6 and 8 francs per kilogram in 1980," say the experts, and they add: "If such a product is to be economically profitable, it must have a market value in excess of 10 francs per kilo(...). Likewise, when it comes to proteins, the market ceiling was set at that time by the price of soybeans (2 francs per kilo); the same applies to the competitive appeal of starches, lipids, and glycerol" produced in such ways.

On the other hand, for some of these compounds, such as the carrageens (Irish mosses) used as thickeners in dairy products, and in which France is second in the world with an annual output of 2,000 tons, new prospects are opening up; the reason is that here we are talking about chemical substances which now sell for 80 francs per kilo. Microalgae, according to Mr Gudin, "could bring the cost of manufacturing these products down to 10 francs."

This last argument thus militates in favor of the development of systems run along industrial lines, rather than on open-air operations. Most frequently, these are tubular in design, and "are the forerunners of what could be controlled solar biotechnology." Two approaches are currently under study at the Cadarache Nuclear Studies Center: continuous culture and immobilization.

The first of them consists of a long (180 meters) coil of transparent plastic tubing exposed to direct sunlight, in which a medium of water, carbon dioxide, and mineral salts is circulated. This medium "like a field of wheat, is seeded with a few microalgae which will reproduce so rapidly that the system, as it is being

tested currently under laboratory conditions, reproduces itself in 24 hours." Every minute during which they get sunlight, the microalgae synthesize and excrete into the medium in which they live, chemical molecules which can be recovered by centrifuging and filtering.

The Industrial Phase

Judging from results already achieved with Porphyridium, which produces valuable polysaccharides, Mr Gudin says it is altogether possible that such plants will shortly be producing 30 tons per year per hectare of these chemical compounds, a by-product of which would be an equal quantity of matter -- consisting of the remains of microalgae recovered from the medium and treated -- which could be used to generate methane. Right now, several pre-industrial pilot plants are undergoing tests at Cadarache. In 6 months from now a 100-square-meter unit will be coming on line, and will give us a foretaste of the performance of the 100,000-square-meter installation the research people at the solar biotechnology lab are now designing. When that plant is operational, it will be up to industry to take over.

Despite the fact that it is still heavily energy-intensive and relies on materials -- plastics -- which have relatively short useful lives, this looks like a very promising route to take. The Cadarache research teams seem to be convinced that production of certain hydrocarbons by microalgae, under reasonable economic conditions, is quite feasible.

For that part of the scenario, Messers Daniel Thomas and Claude Gudin have developed a second approach: a "tubular biophotoreactor," in which the algae are trapped in a polyurethane sponge and fed by a stream of water, carbon dioxide, and mineral salts. Unlike earlier systems, the algae in this one are squeezed in like tenants of a public housing project, and spontaneously stop reproducing. As they do under ordinary conditions, the algae produce their excreta of hydrocarbons or polysaccharides, but there is no need to waste energy on keeping the algae in suspension, keeping them in motion, and then gathering their products.

The results have been encouraging enough for the Atomic Energy Commission to be talking seriously about taking out patents sometime soon. So how long will we have to wait for essence of seaweed?

9182

CSO: 3698/101

BIOTECHNOLOGY

MERITS, PROBLEMS OF EUROPEAN BIO-AGRICULTURE COORDINATION

Paris LE MONDE in French 21 Sep 83 p 15

[Article by Maurice Arvonny: 'Very Promising Spinoffs for European Agriculture']

[Text] The international roundtable on biotechnologies, just concluded at the Institut Pasteur in Paris, was the setting for some progress reports on research and for the announcement of a few new breakthroughs. Mainly, though, it demonstrated a rush toward mastery of the biotechnologies: all branches of the field are moving rapidly, but the front-runner is certainly vegetal biology. Vegetal genetic engineering has not run into the difficulties initially anticipated: the vegetal cell fusion techniques look very promising indeed. The vice president of the mobilization program known as the "Biotechnology Takeoff," Mr Pierre Douzou, feels now that we can expect major agricultural applications of the infant science within 10 years; 2 years ago, he was talking in terms of the year 2000.

This means that it is important for France and the other nations of Europe to take care not to be left behind by the United States and Japan. Obviously, none of us can take on these two giants single-handedly. Hence the instructions given by Mr Laurent Fabius, minister for industry and research, and reiterated at Geneva by President Mitterrand at the opening of the conference on the Electronic and Physics Laboratory's particle bombardment installation, as to France's intention to suggest major ventures to its European partners in the area of research and development.

Biotechnologies are not the only area where proposals may be expected, but they are one area which lends itself with particular felicity to European action, if only because of the problem crucial to the EEC: farm surpluses. Europe currently produces more milk, wine, sugar, and grain than it can sell. The amazing takeoff of vegetal biotechnologies opens the way to processing this surplus into raw materials worth far more than the actual crops, such as milk-based casein which has already found some totally serendipitous applications in fields as disparate as

candy and buttons. Turning the process around, biotechnologies could enable the Community to compensate for Europe's shortages of animal feed protein or of wood for paper pulping.

The research and development efforts in the biotechnologies, which now amount to a grand total of a billion francs this year in France, are just about equalled by those in Federal Germany, Great Britain, and Italy; other countries, like Denmark and The Netherlands, need not envy their neighbors. This just may be the key to avoiding the rocks and shoals on which a lot of European ambitions have come to grief: fear of those who are not in a position of strength that any joint effort will redound mainly to those in a better position.

Research proper will not be nearly so critical as will its "stewardship" in fostering fruitful cooperation. Three areas clearly must get priority attention: training people for research, biological resources, and technological resources.

The shortage of skilled biological engineers is acute, but the "gaps" are not the same everywhere. In France, we lack microbiologists more than other skilled workers. Elsewhere, the shortages are felt in other disciplines.

It will become increasingly easy to put new biotechnologies to work as we build major stockpiles of organisms or select the right agent for the job. The bacteria collection at the Institut Pasteur, the collection of non-mycelial fungi at the Museum of Natural History, are major resources, but still not sufficient. We shall have to go on to build up collections of artificial biological life-forms, such as hybrid cells or monoclonal antibodies.

Lastly, we shall need extensive data banks to store information on the properties of microorganisms, enzymes, and the like, for quick retrieval. More generally, computer technology is fast becoming a standard tool in biology, as it already is in physics and chemistry.

In these three sectors, the idea of European cooperation, of sharing resources, pleads its own case. The difficulty, of course, is finding the financial wherewithal. Some ideas have been suggested, even so, and the growing awareness of what the biotechnologies can do for agriculture should render the decision-making process a lot easier

9182

CSO: 3698/101

BIOTECHNOLOGY

FRENCH FERMENTATION INDUSTRY USING COMPUTER CONTROLS

Paris LE MONDE in French 13 Oct 83 p 36

[Article by Michel Dabaji]

[Text] Real-time controls for a fermentation facility. With the acquisition of a 3-cubic-meter pilot fermentation vat run by a computer, the Rapidase Company is looking to the time when automation takes over in industrial fermentation plants, and hence to finer tuning capacity for its products.

The Rapidase plant at Seclin, in the Nord, has just bought itself a new pilot fermentation vat. Notable for its size (3 cubic meters of sterile fermentation plus a 300-liter "satellite" costing a total of 2 million francs), this installation, built by Chemapec, will very shortly be hooked up to a computer. Initially, the computer will practice on data acquisition and regulating points of delivery, and will actually take over operation of the fermentation plant in 1984.

It is this "micro-biology-fermentation" service that maintains liaison between the genetics scientists and production that will benefit most by the computer's presence. The computer itself, (a Minc, from Digital Equipment) which will run the pilot plant (it is also tied in with four other 10-liter laboratory fermenters), will handle permanent storage of all data input by a battery of sensors installed on the fermenter (the standard parameters of the fermentation process: pH, temperature, dissolved oxygen, O_2 and CO_2 emissions, etc.) and will perform the resulting calculations of yield. If these data are processed "off-line," the acquisition system will be kept running 24 hours a day, and printouts, graphs, or curves will be produced at regular intervals.

"With microorganisms working nights, days, and holidays, we can't ask the technicians to keep an eye on them throughout their total growth process," explains Robert Delecourt, Rapidase scientific director. Any more 'finely-tuned" management of this equipment

would require continuous monitoring of all these parameters, if only so as to be able to "react instantly to any anomaly or weakness in the microorganism."

In addition to real-time monitoring, which at the very least will provide an explanation for any anomaly, computer technology offers still another advantage: in a field where a variation of 1°C in either direction could utterly ruin the product, you can be sure that the computer will follow orders to the letter, even when it comes to minor procedures...

Fermentation Specialists

Rapidase, which is part of the Netherlands' Gist Brothers group. produces bacteria-generated enzymes as well as enzymes from fungi, and has been doing so since 1922. In other words, Rapidase knows all about fermentation ... and its random quirks. In this 280-man company, 50 of whose employees are engaged in research: the genetic service (strain selection), the fermentation division (studying optimal conditions for growth of those selected strains, including their physiochemical parameters, including technologies), in addition to the upstream specialists expert in extraction and purification, biochemistry, and control or applications (in client operations).

Rapidase's acquisition of this pilot plant is part of a program launched more than 2 years ago. Its goal, in addition to testing the sensors with a view to possible applications for them in manufacturing, is, "thanks to heightened frequency in acquisition of new expertise, to build more sophisticated growth models which can be transplanted to the 100, 150, or even 180-cubic-meter fermenters in full-scale production operations," says Robert Delecourt. In this sense, a 3-cubic-meter pilot plant is close to being of a sze "compatible" with industrial installations. Besides, 3 cubic meters (which means 2 to 2.5 cubic meters of "soup") is a size of keen interest to research teams working on processes. Example: "In order to extract a specific product, enormous quantities are required so that, here again, all results are significant and equally transferable to an industrial scale."

6182

CSO: 3698/101

COMPUTERS

FRG'S SIEMENS PROFITS FROM MEDICAL TECH BRANCH IN 1982/83

Duesseldorf HANDELSBLATT in German, 3 Nov 83 p 17

[Article entitled: "Siemens, Inc./Medical Technology Successful Worldwide. New Developments Met With Success Especially in the United States"]

[Text] HANDELSBLATT, Wednesday , 2 Nov 1983. gw Erlangen. With new products, in which microelectronic plays an important role, the Medical Technology Division of Siemens, Inc., Munich/Berlin, has clearly been able to expand its world market position, declared Dr Friedrich Kuhrt, member of the board of directors responsible for it.

In so doing, great successes were achieved especially in the innovation-ready U.S. market. In 1982/83 (September 30), too, the receipt of orders of the UB Med [Medical Technology Division], which in the previous year had already increased by 13 percent to DM 3.5 billion, continued to increase worldwide. But for the first time since the mid-1970's--after a 7-year stagnation of the amount of orders coming in domestically--the domestic market once again accounts for a larger share of the placing of orders.

In recent years, the growth had primarily come from abroad, with the U.S. market playing a key role. If in 1976/77 only 13 percent of all orders for the Medical Technology Division came from the United States, during the past fiscal year they already accounted for more than 30 percent. Thus, according to Dr Kuhrt, the United States have become the most important client of the Medical Technology Division of Siemens.

In organizational terms, too, the Medical Technology Division, too, has taken into account these structural changes in order to be able to make still better use of the possibilities in the United States. For this reason a Medical Company of its own, the Siemens Medical Systems, was created within the framework of the new U.S. organization, to which two factories belong--one in Walnut Creek for linear acceleration, and one in Chicago for nuclear medicine instruments.

Internally, too, the organization of the Medical Technology Division was restructured: The business sector for X-ray technology, which had grown disproportionately in recent years and in the meantime accounts for almost [illegible] percent of the business volume, was divided. Now, in addition to a business sector for "X-Ray Diagnostics", there is also a business sector called "Split-Image Process and Therapy", which combines isotopic tomography, computer tomo-

graphy, ultra-sound, nuclear medicine and radiation therapy.

According to Kuhrt, the new products in particular are proving to be a vehicle for growth: Thus in 1982/83 two and a half times as many computer tomography machines were manufactured as three years ago. In so doing, the newest development, the isotopic tomography machine, met with a positive reception on the world market. Especially from the United States already several orders have come in for these instruments, which after all cost DM 4 million each.

With respect to the new generation of patient-surveillance instruments, too, the Medical Technology Division, it was pointed out, has conquered a place for itself at the very front of the world market. For the new Sirona M 1 dentist treatment station, which was marketed only in 1983, already more than 1,000 orders have been received.

8000
CSO: 3620/121

COMPUTERS

FRG'S SIEMENS, UK'S ICL, FRENCH CMB DO 5TH GENERATION RESEARCH

Hamburg DIE ZEIT in German 4 Nov 83 p 37

[Article by Hermann Bossenecker: "Following the Japanese Model. Siemens Intends to Conduct Research Jointly With Two European Competitors"]

[Text] The boss will be a Frenchman, the language of the firm--English, and the location in the Munich area. Three leading European computer manufacturers have agreed to establish an institute on the basis of this conception, which, beginning in 1984, "in the forefront of competition" is supposed to conduct joint research for the large computers of tomorrow and thus to challenge Americans and Japanese. The agreements will be signed yet this year.

The German Electro-Combine Siemens, the French Compagnie des Machines Bull and the Britisch International Computer Ltd. (ICL) are thus drawing the conclusion from the concern that the Europeans might fall behind in connection with the "Fifth Computer Generation". The latter is the focal point of the efforts of the Japanese in particular, with an institute established a year and a half ago by six firms jointly with the Department of Trade MITI [Ministry of International Trade and Industry] that is to expend more than DM 1 billion during the next few years. (See also p 36 "Japan Pretends to be Harmless".)

As in Japan, the work of the Munich Institute is to concentrate, above all, on the "processing of knowledge": A concept with which even the expert in electronic data processing cannot do a whole lot. The goal is to make the new large computers more capable of learning and thus more similar to human intelligence. For this reason people are already talking about "cognitive systems" and "artificial intelligence"--but what the thinking machines of the future from the Munich think laboratory will look like in the end--about this there can today be conjectures at best.

The tri-national "brain trust" is to be joined not only by the leading specialists of the three founding firms, which will finance the institute in equal proportions, but also scientists from elsewhere. Likewise the collaboration of researchers at universities and public institutions is welcome. In two years the team of experts is to number 50 individuals.

This initiative, which has also attracted a good deal of attention abroad, cannot be compared with the foundered computer triple alliance "Unidata"

in the 1970's between Siemens, the French CII (which in the meantime has become absorbed in Bull) and the Dutch Philips-Combine. At that time the entire computer business of these firms was to become combined. Now the three enterprises are entering a relatively loose union in only a partial area. The research efforts of their own are not to suffer as a result. And even if the Institute of the three will certainly be the most important contact partner for the research of the European Community with a similar goal (logogram ESPRIT), the three are still free to operate here, too, separately from case to case.

Undoubtedly, the cooperation of the three is also an expression of the new style which made its entry at Siemens during the past two years. Before that the chronically deficit sphere of data processing of the Electro-Combine had again and again been criticized in public because of its breakdowns and omissions. The "outsider" Claus Kessler, 53 today, was ordered in mid-1981 from the enterprise sphere of energy technology in Erlangen to the Siemens Central Office for Computers in Muenchen-Perlach (Datasibirsk) in order to get rid of the losses there at last.

What sceptics hardly expected, he has evidently managed to accomplish relatively quickly: Not only to lift the computer-branch of the combine into the profit zone during the past business year 1982/1983 (September 30), but also to raise its image in the industry and to instill greater confidence in the customers.

In April of next year Kessler's sphere of work will expand considerably: The data technology directed by him will be merged with the private customer-oriented spheres of communications technology into the new enterprise sphere of communications and data technology. In so doing, the "trained" energy technician Kessler advances as the strong man of Siemens electrotechnology.

His thus far most important customer-strategic action was the promise to expand the operational system (the machine programs) for the computer family 7500 by the end of 1985 at the latest in such a way that the models of the "second family" 7800 obtained from the Japanese cooperation partner Fujitsu also function with it. The background: A few years ago, the Japan-computers were added to the sales assortment in order to entice customers away from the market leader IBM. For Fujitsu and IBM are fully "compatible" with one another and therefore can be operated with the same programs. The problem, however, was that Siemens customers cannot directly ascend from the Siemens-produced series 7500 to the--still larger--Japan-jumbos. They therefore had to be given the promise that this would be possible in the foreseeable future.

Kessler firmly embraces such an "entirely focused compatibility policy": "What in communications technology is a matter of course, an open world, that must also be attained in data technology." With this strategy one wants in the future, too, to preserve the independence of the enterprise in the computer business and to cooperate only on a case to case basis with other firms. Thus the new Institute, according to Kessler, is only "a facet of our openness". In the "core working areas"--this is Kessler's motto--"we want to rely on our own achievements". The sale of the products developed by Siemens

has absolute priority, according to Kessler. The share of the Fujitsu large computers in the total sales volume of the hitherto-existing enterprise sphere of data technology is only about one-tenth.

Already in 1981/82 the sales volume in the computer branch had exceeded the DM 2 billion mark (plus DM 300 million in deliveries and services for other Siemens spheres). In the fiscal year just concluded, a plus of more than 10 percent was registered. In addition to the larger sales volume, Kessler attributes the fact that the profit situation has clearly improved, above all to the considerable success in rationalization: "In two years we were able to increase the productivity per employee by 27 percent."

Even if in the future the emphasis is to be on the firm's own developments, Siemens will continue the cooperation with Fujitsu in any case. Completely open is the question of whether the combine will also get involved with Gene Amdahl's new firm "Trilogy Ltd.", which beginning in the year after next intends to produce and market a large computer with "superchip" in Ireland.

The former IBM man Amdahl had in the 1970's established the Amdahl Corporation, which is expanding now as before, in Sunnyvale, California, but later left it and concentrated on his new project Trilogy. Up to now he has managed to shake loose $200 million in round figures for it. The U.S. firm Sperry Corporation has contributed 15 percent and is willing to pay $42 million for the acquisition of shares for licenses alone. Furthermore, Digital Equipment Corporation has purchased a share of the enterprise with $26 million (9 percent of the shares) and the French Bull--with $13 million. The German competitor Nixdorf is toying with the idea of a major investment. The cautious word from Siemens for the time being is: "We are looking at it. . ."

In no case does Siemens want to miss the connection with respect to the new high-performance computers. Werner Poschenrieder, member of the board of directors, up to now chief for technology in Kessler's enterprise sphere and in the future under him specifically responsible for data processing, to be sure, is not certain "whether at some point there will be the big bang and the fifth generation will be there." He is rather betting on an evolutionary development and suspects among the Japanese "a strong touch of gigantomania".

[illegible]
[illegible]

MICROELECTRONICS

SURVEY OF SIX POTENTIAL 'SILICON VALLEYS' IN SWEDEN

Stockholm DAGENS NYHETER in Swedish 7 Nov 83 p 8

[Article by Ake Lidzell, Sture Ryman, Bo Engzell, Olle Larsen and Caj Noren: "Municipalities Back Swedish Silicon Valley; Everyone Fighting for Computer Firms"]

[Text] The electronics industry is the future industry of the world!

That prognosis has given a number of politicians, planners and municipal commissioners all over the world the idea that the employment and economy of their particular place will be saved by new computer jobs.

Their model is Silicon Valley in California, where the electronics industry grew up around Stanford University and became the growing ground for billion-[kronor] corporations such as Apple, Atari and Hewlett-Packard.

In Sweden a number of places have decided to become the Silicon Valley of Sweden.

DAGENS NYHETER visited six hopeful towns.

Timra

Sundsvall, Sunday--"We already are the Silicon Valley of Norrland," says Municipal Commissioner Kenneth Westberg of Timra, which is quickly constructing two industrial buildings for about 10 companies in the computer and electronics industry and has plans for four more with 1,365 square meters each.

The new companies have already produced 50 jobs and are small, to be sure, but they have started cooperating, utilizing each other's qualifications, learning from each other, so that they can compete with the major companies even for larger projects.

When the many small firms meet, there is an outbreak of some form of "brainstorming", ideas and strategies develop and the companies already in place form an exciting focal point for innovation.

On 7 December Timra will inaugurate its "computer valley," and at that time it wants to demonstrate the many advantages of this place of establishment. The prognosis for the next 18 months is for a doubling of the computer jobs, and it is expected that the innovations will have a spin-off effect in the manufacturing branch of the electronics industry, that new lifebuoy for municipalities fighting for jobs.

In Timra it is a matter of replacing 500 jobs which disappeared when SCA [Swedish Cellulose Inc.] modernized its factories in the municipality.

Holding a Trump Card

"Timra has many trump cards on hand," Westerberg says. Located squarely in the center of Sweden, a neighbor of Sundsvall which is the country's most densely computer-populated municipality, it is close to the E 4 highway, the railroad and only 3 kilometers from Midlanda, one of the country's largest domestic airports.

A good example is Instrumatic, which already has 11 employees and great expansion opportunities. The young business owners have developed a world invention, an electronic measuring device, which will make for example mechanical recording devices obsolete. Components from Japan, their own idea, manufacture at Teli in Sundsvall.

"They expect to sell 300 devices the first year, but the world market is enormous," managing director Kurt Sjoblom says. In Sweden alone about 100,000 old recorders are being used.

Timra is not a subsidy area but has advantages nevertheless. Buildings are tailor-made for the companies, which may later buy out the municipality.

Subsidies

In addition, the regional administration can supply a contribution of 20 percent of the investment costs. If one invests for example 1 million, it is possible to get back a maximum of 200,000. But the subsidy is tied to new jobs.

"I think that is healthy," says Lars Andersson, managing director of the Timra subsidiary of DataSweden (DIAB, Ahlsell, Luxor). "We are reimbursed 50,000 per new job up to 200,000."

DataSwed has developed a revolutionizing new system for monitoring district heat technology, among other things.

"What is most important is the stimulus of participating in the development of an electronics center, in which it is possible to share knowledge and equipment costs, cooperate on large projects and in that manner perhaps become just as strong as major competitors, in spite of being small."

It is a lot of work, but fun as well. And the ideas are pouring out.

Linkoping

Linkoping,Sunday--Linkoping has not exactly thought of itself as a Swedish Silicon Valley, but at the same time Municipal Coummissioner Gothe Andersson wonders which Swedish municipality could measure up to Linkoping as regards computer technology.

He is also convinced that Linkoping will pull ahead even more and dominate completely at the end of the 1980's.

"We are tremendously far ahead, thanks to the Institute of Technology being first in the country with its efforts in computer training and research. Today, the municipality and the Development Fund are backing Technology Village with its Technology Center.

At Technology Village and Technology Center researchers and companies rent space. Some split their time between the institute and industry, others have already spun off, as the term is called. Rents are subsidized, companies receive marketing assistance, economic counselling and secretarial help. Seventy percent of the deficit is covered by the municipality and the remainder by the Development Fund.

The Mjardevi project is Linkoping's next major step. This is purely an industrial research area, planned in close connection with the Institute of Technology.

"In addition to the researchers at the Institute we have unique qualifications in a number of companies in the municipality, for example Saab, Ericson, Foa, (Defense Research Institute), VTI (Road and Traffic Institute), The Geotechnical Institute etc.," Gothe Andersson says.

"Ten years ago having computers as part of the education was not obvious, but Professor Per-Erik Danielsson fought hard for computer technology and research. So today we have our own profile."

Of the 65 research millions at the Institute, 25 million are for computer research.

"There are about 50 computer firms in Linkoping and in all certainty about 30 of these have spun off from the Institute."

Bjorn Kruse and three colleagues started Imtec about 2 years ago. Today they number 38 employees and next year expect to be about 50.

Kruse believes that Linkoping could become a computer center to reckon with, since there are plenty of companies, and qualified personnel can easily change jobs. And he agrees with the municipality that in addition to the researchers

at the institute there is plenty of other technology in Linkoping. But it is necessary to have a technological institute in the background.

Lund

Lund, Sunday--Lund's Ideon is to become a large-scale Swedish Silicon Valley. A project which is supported by many industries and involves perhaps 1,500 new research positions! A couple of hundred million kronor are now being pumped into construction of the new Ideon science park.

Lund municipality pays nothing. The state pays for two salaries at the SUN foundation, which stands for Cooperation University-Business and Industry. That is all. Beyond that, the industries moving to Lund must absorb all costs themselves.

Provicial Governor Nils Horjel in Malmo is the one who has pushed for the SUN project and thus the Ideon science park in Lund. He hopes that it will also result in many valuable spin-offs and manufacturing industries for Scania. Jobs are needed there.

It may also be assumed that it is Horjel who got the largest company, Ericsson Radio, to come to Lund. Horjel has been chairman of SRA [Swedish Radio Inc.], which is now part of the Erisson group, for many years....

At the beginning of the year Skanska Cement begins construction of Ideon 1 and Ideon 3, the first major phases of the science park. In addition, a scale-up facility for chemicals is being built. It will house long-range research, among other things, and will also be of importance to education.

The Ericsson leadership has revealed that a thousand or so researchers may go from the company to Lund in a few years. Asea is also on the way to Ideon.

"Nine firms are ready for Ideon even now. We are negotiating with another 15-20 about moving in," says Christer Hjort at Lund University.

"Neither the state nor Lund University are supporting Ideon financially, with the exception of the state paying two salaries at SUN," says Sven-Ture Holm, who is managing director of SUN. "We are buying the land where Ideon is being built from Lund municipality."

It is hoped that Ideon, where a chemical industry, among other things, will also be established and where much is founded on cooperation between industry, on the one hand, and the institute of technology-university on the other, will become a "lift" for Scania.

Lulea

Lulea, Sunday--The greatest expansion in the business and industry of Lulea municipality during the 1980's will take place in computers and electronics!

These are the words of Municipal Commissioner Sven Kohler in Lulea. Here they "thank" the Institute of Technology for the approximately 400 new jobs in computers and electronics which have developed over the last few years.

What was most remarkable this last year was the establishment of Asea Industry and Erisoft--an Ericson company. That provided 45, mainly Lulea-educated, graduate engineers with computer jobs. Abelco, an electronics company, is also located in Lulea. Regioninvest and SSAB [Swedish Steel Corp.] also have their own computer firms.

Kenneth Hjelmdahl is commercial secretary in Lulea. He is of the opinion that the Institute of Technology is Lulea's foremost attraction when it comes to computer and electronics companies. But the computer training at the high school level and extensive social services in other areas are other enticements.

The fact that the provincial administration is seated in Lulea is another "plus" for Lulea as a location site. On the other hand, the 30-35 percent location subsidy does not seem to play much of a role.

Asea, for example, established itself without receiving any support at all. Lulea is in the lowest subsidy class, which also exists in many places in central Sweden.

Municipal Commissioner Sven Kohler predicts that the number of computer and electronics jobs will triple during the 1980's.

Lulea has made great efforts to supply business premises quickly and to offer administrative support and contact-creating activity for newly established firms. Asea and Ericson, for example, recently acquire new premises in 5 months.

Gosta Eklund at Asea is convinced that the computer and electronics climate created in Lulea is favorable for continued expansion.

Kista

Around Kista, within a circle of 7 kilometers, lies 70 percent of the Swedish electronics industry. In Kista alone there are about 50 companies which work more or less with electronics.

About 20 of them are large companies, which employ about 6,000 of all persons working in the electronics industry in Kista.

Kiruna, Timra, Lund and several other places have ambitions for becoming a Swedish Silicon Valley. Those established in Kista and surroundings smile at that.

The electronics industry requires highly trained people and they are difficult to lure into sparsely populated areas, they say.

Kista became attractive earlier because of its very rapidly expanded housing, services such as schools and day care centers, roads, subway, park and sports facility. Kista was also the area of Stockholm which was next in line for development, at the same time as the electronics industry grew and needed more room.

Two Lots

Today there are only two lots left in Kista, and the final trump card will be the electronics center to be developed by industry in cooperation with the municipality, the institute of technology and the university.

John-Olle Persson, commissioner in Stockholm, has enticed representatives for a number of major Japanese electronics companies to visit Kista next spring.

"No promises of establishment have been given, but we are satisfied if they just come," the commissioner says.

"We have several companies knocking on the door, and there will be more when it is clear that we will have an electronics center," says Anders Nylander at the Stockholm Industrial Site and Development Company.

"What is decisive is not that it is charming and inexpensive to live and settle down but it is the contacts, meeting the right people and settling where there is education."

Moving Out

In December the study will be completed which is expected to propose that the microwave institute of the Institute of Technology should move out to Kista.

"The electronics center is to become an embryo for an electronic research institute," Gunnar Brodin, principal of the Institute of Technology, says.

There are also plans for setting up a 1-year extension or continuing course for graduate engineers in Kista.

Furthermore, one would like to train technical college engineers to become qualified technicians by means of a 2-year extension course. Stockholm University is thinking of establishing a computer science section at the Kista electronics center.

Great Demand

"There is great demand for both technicians and graduate engineers in Stockholm and we need to expand the continuing education. The development in the electronics and computer industry is very rapid. One can easily become rusty," says Gunnar Brodin at the Institute of Technology.

The Kista electronics industry is extremely anxious to have the Institute of Technology locate there, and the institute in turn is dependent on cooperation with industry and on the teachers it gets from there.

"We are working on bringing parts of our activity to Kista," Gunnar Brodin says.

With that Kista hopes to win the struggle to rightfully call itself Sweden's Silicon Valley.

Kiruna

Kiruna, Sunday--"In this branch of industry it is by no means a disadvantage to be located in Kiruna; on the contrary! Here we have much greater chances for keeping our personnel," states Roland Fastberg, local manager for the General Engineering Bureau, AIB, in Kiruna. He is of the opinion that Kiruna is in the process of acquiring a fine "highly technological climate."

AIB began in February. In 2-3 years the 13 employed computer engineers will become 30. The company is working with computer-supported construction for the building and manufacturing industry. The personnel consists of former Kiruna residents who have returned home.

Most of the computer and electronics sector revolves around the space activity conducted at Esrange and at Kiruna Geophysical Institute, KGI.

Esrange has about 70 employees and its subsidiary, Satellitbild AB, makes computer analyses of satellite pictures. Fifteen employees today, w[illegible] are to number 117 at the end of the 1980's.

U. S.-owned Control Data has about 20 employees, and the Siga service center with 20 employees expects to have about 100 in a few years.

KGI has about 60 employees. They work with research, the training of researchers and undertake measuring and registration activity involving, among other things, aurora borealis--one of Kiruna's "assets."

The national organization of handicapped has already begun to train the approximately 25 persons who will work with computer-supported production of pictographic writing in Kiruna.

Teledata i Norr AB is to start up this spring in Svappavaara. Ten persons will work with computerized information.

Kiruna Institute of Technology has applied for permission to start a "space university" in Kiruna. It is to become an international research and development institution.

Municipal Commissioner Lars Essling expects Kiruna to get about 300-400 new jobs in the space computer and space electronics field over the next 4-5 years.

"We believe this to be only the beginning. This development will attract other computer and electronics companies," Essling says. "The location subsidy is a very important enticement for Kiruna. For example, the General Engineering Bureau received 6 out of 9 million kronor for the new computer equipment as an investment subsidy."

11949
CSO: 3698/113

MICROELECTRONICS

FRENCH, U.S. FIRMS JOIN TO PRODUCE SILICON WAFERS IN FRANCE

Paris ELECTRONIQUE ACTUALITES in French 28 Oct 83 pp 1, 15

[Article by JP Della Mussia]

[Text] The Rhone-Poulenc group and the American company Siltec have announced the signing of an agreement to jointly build in France, a silicon wafer plant for the semiconductor industry. Siltec, which is one of several American silicon manufacturers, covers about 15 percent of the United States market.

This agreement stipulates the creation of a joint company under the name of Rhone-Siltec, whose shares will be divided equally between Rhone-Poulenc and Siltec. An investment of the order of 240 million francs is expected.

The plans call for Rhone-Siltec to start production by the end of 1984. At first, the new company plans to sell its products throughout western Europe. Subsequently, a long term research cooperation will be established between Siltec and Rhone-Siltec.

Since the launching of the concept of an electronics industry, this is the first time that the missing link in the silicon-to-finished product chain has been installed in France. But odd as it may seem, Rhone-Poulenc states that it has taken this decision on its own initiative so as to diversify, and not under pressure from the government. However, the latter is expected to support the project to an extent which we have not been able to assess (and which in fact does not appear to have been established).

Maintain Jobs

This initiative seems to have been originated by a subsidiary of Rhone-Poulenc, Sopran, a company responsible for site reconversions for the group, especially in the case of textile plants. Sopran seeks to exploit Rhone-Poulenc's know-how in sectors that are undergoing strong development, hence the idea to produce the silicon wafers which are in growing demand from the semiconductor industry.

But starting from scratch was out of the question: Wacker, the sector's world leader, is located next door, in Germany. It would be idealistic to attempt to surpass it from a standing start: an association was thus essential.

Contacts were probably made with Monsanto, which is the second largest in this sector, but Monsanto is already well established in Europe, and it conceivably would not have been very interested in an offensive from France. There remained the two companies tied for third and fourth places in the sector, Dynamit Nobel and Siltec. The former already has an unit in Italy (ex-Smiel). The latter, on the other hand, is very little known in Europe and so far has made no efforts at publicity: it was seduced by Rhone-Poulenc's interest in this sector. This gave birth to a project which rapidly outgrew Sopran's level, rising to the level of the group's leadership. The major outline of the project is now known. The location of the plant, on the other hand, is not: it will undoubtedly depend on current negotiations with the government.

Toward a Turnover of $20-30 Million

The advantage of the operation for Siltec is clear: by investing a minimum sum (not disclosed), and by contributing know-how, the company will be able to penetrate the European market on which Rhone-Poulenc is well known. Its profits will come from licenses, from profit sharing with Rhone-Siltec, and maybe from the sale of certain products that are not manufactured in France.

But Rhone-Poulenc will not be a subcontracting company for Siltec, at least not in the long term. Rhone-Siltec will conduct its own research, and Rhone-Poulenc will acquire a 10 percent share in Siltec's capital, and a seat on the company's board of directors. (All this is speculation since the operation is subject to approval from the French and American governments, and to the finalization of financing arrangements).

For Rhone-Poulenc, this operation represents an opportunity to diversify, which might not arise again soon. When the operation is initiated, a manufacturing unit will be built that is even more modern than Siltec's most up-to-date plant.

It will produce standard wafers no larger than 4/5-inch, at the same cost and of better quality than the large German neighbor. The agreements stipulate that in the intermediate future Rhone-Siltec will compete only on the European market, which is estimated at $120 million for 1984 (the world market is estimated at $750 million). Eventually, Rhone-Siltec is aiming at a 15-30 percent share of this European market. The planned production capability is "several million wafers per year," namely 10-20 percent of Wackers' capabilities. Rhone-Poulenc has not set a date for reaching a profitability threshold, but promises that everything will be done to achieve the most rational management. It is therefore not a matter of starting a business with an elusive future profitability, such as Crismatec. (We might point out that the latter company, a joint subsidiary with AEC, also develops single crystal materials for electronics, and is in fact very competent in its field. Unfortunately, it produces only materials whose market is still not very well developed, such as substrates for bubble memories; as a result, its losses are very large.) By contrast, Rhone-Poulenc is accepting an industrial risk on a strongly growing market.

It might be remembered that so far, only the company Siltronix produces wafers in France, essentially for universities and laboratories (small diameters), but also for semiconductor companies when they need small lots (1982 turnover of 20 million francs, 50 percent of which from exportation).

We should also point out that the government (the military, essentially) has always wanted a silicon wafer industry in France, in order to bolster supply reliability for the French semiconductor industry. However, due to the presence of Wacker in Germany, this industry is less strategic for the country than that of downstream industries such as wafer steppers.

11,023
CSO: 3698/116

SWEDISH FIRMS MOVE TO SILICON VALLEY FOR TECHNOLOGY, MARKETS

Stockholm VECKANS AFFARER in Swedish 13 Oct 83 pp 70-71

[Article by Stefan Mehr]

[Text] Ulveco, Asea-Hafo, Ericsson, Primdata--Swedish electronics firms are now moving in a steady stream to the heartland of high technology, Silicon Valley in California. The reason is that they want to be on the spot and keep up with developments. But the business opportunities also are attractive. There is a potential market for Swedish products there.

San Francisco--At a time when electronics firms are starting to go under in Silicon Valley, the Swedes are on their way in. Many Swedish electronics and computer companies believe they cannot keep up with rapid developments in their fields unless they are on the spot in California. For this reason, they have opened offices in recent months throughout the "Silicon Valley" near San Francisco.

"Record Fall"

"Never before have we had so much to do," said Per Henrik Wendelstam, head of the technical attache's office in Los Angeles. "All records are being broken this fall."

Next month the attache's office will send two officials from Los Angeles to San Francisco so they can be closer to Silicon Valley. One will keep up with developments in electronics and the other will keep an eye on the venture capital market.

Swedish firms that have located in Silicon Valley include Ulveco, Asea-Hafo, Ericsson, Dataindustrier, Elektronikgruppen i Lund, Primdata, Supercool, and Pound Office. Most of them intend to monitor technological developments and pick up new products at an early stage. For some, this is also a first step into an important export market.

Ulveco, of Akersberga near Stockholm, began a market survey 1 year ago on the possibility of exporting power supply units to Silicon Valley. The survey is still being conducted, but in the meantime the firm has received orders from American companies worth $4 million and opened offices with many employees. The head of the company is Per-Ove Stopp, who moved to Silicon Valley almost

3 years ago.

"I came here after I sold my electronics firm, Saven AB, to Uddeholm. Now I am working solely for Ulveco. The company has decided to enter the market here. The Swedish devaluation and the strong dollar have made the price of Ulveco's power supply units competitive. American companies that export to Europe need a power supply that meets the strict European safety standards."

Per-Ove Stopp would not divulge the names of Ulveco's American customers. The contracts prohibit revealing that information.

"American electronics firms like to pretend that they manufacture all parts themselves. They do not want any leaks revealing who made what."

The largest Swedish investments in California are being made by Asea's electronic component company Asea-Hafo from Jarfalla. In the midst of the lion's den, they are building Asea-Hafo Inc, which will produce made-to-order microcircuits for American electronics firms. The Swedish company will manufacture them in Sweden and send them back to the customer. Despite the long distances involved, they will do the job in a shorter time than that required by their American competitors.

Asea-Hafo Inc has established itself in San Diego in southern California.

"We did not dare move directly to Silicon Valley," said Ingemar Hoglund, head of the American subsidiary. "There are so many competitors there that it is difficult to obtain loyal workers. When we hire people, we want them to stay."

The American market is extremely important to Asea. Asea is hoping for sales of $1 million the first year and between $10 and $20 million the next 5 years. This figure may be compared to Asea-Hafo's total 1982 sales of $15 million at today's exchange rate.

"Custom-made integrated circuits presently are a small part of the market, but surveys show that this share will increase to 50 percent by the end of the eighties. That is why we moved here," said Ingemar Hoglund.

The strategy is to obtain production jobs for already designed circuits, to design and produce circuits themselves, and to sell their own design systems through licensing arrangements.

For several months now Goran Edensvard has been working north of San Francisco. Together with Ulf Moren, he will sell so-called peltier elements, manufactured by Supercool of Goteborg, in the United States. These elements cause cooling electronically, with no moving parts. They estimate that the market on the west coast of the United States is about 50 million kronor. They hope to capture 10 percent of that market in 12 to 18 months.

"I think it is strange that there are not more Swedish companies in Silicon

Valley," Goran Edensvard said. "We must be here to keep up with rapid developments in the computer and electronics fields. In addition, it is difficult in Sweden to have any control over the American electronics firms we are dealing with."

One example of this is SATT Elektronik. SATT acts as an agent for the Silicon Valley company Dynabyte. Some time ago it discovered defects in Dynabyte's products and learned by rumor that the company was having problems. They top management was suddenly replaced by the venture capital organizations behind the firm. About 1 week ago SATT brought the new president, Bill Parker, to Stockholm to discuss the situation.

"It is understandable that they were worried," Bill Parker said. "The competition is fierce in Silicon Valley and technological developments are so rapid that products sometimes are forced out onto the market before they are ready. That is what happened to us, but now we are on the right track again."

"We were not totally uninformed of the situation, but it was difficult to step in when we were not there, on the spot," said Nils Ljung of SATT Elektronik in Stockholm.

Nevertheless, SATT is not considering opening its own office in Silicon Valley.

"We travel there often and make telephone contact daily. I spend 3 or 4 months there each year. We believe that is enough."

SATT as agent for seven different companies in the United States and imports everything from transistors to magnetic discs. Together with the distribution company Telko, they have total sales of 65 million kronor, 30 million of which is from American products.

"Ridiculously Simple Idea"

Primdata, a subsidiary of Svenskt Stal, came up with an idea several weeks ago that was extremely well received after a thorough PR campaign.

Primdata offers computer capacity by utilizing the world's time zones. When it is evening in Sweden, the work day is beginning in California. Using a telephone linkage to Sweden, large corporations that need to increase their computer capacity can utilize Primdata's computers in Oxelosund at a price that is 35 to 50 percent lower than what similar services would cost in the United States.

"The idea is ridiculously simple," said Inge Selinder. "But no one had thought of it before. If we have just three or four customers with a capacity of 40 terminals each, the process will be profitable for us."

Round Office is not an electronics firm, but their furniture is designed for the computer age and there is a great customer potential in Silicon Valley. Since June they have had an American subsidiary in San Francisco and they are

now setting up an exhibition hall.

"There has been a favorable response and we have already furnished a Wells Fargo office," said Anders Norlin, president of the new subsidiary. "Our estimated sales for the first year are 5 million kronor. Our goal is to establish a retail chain in the United States."

The giant Ericsson concern is also utilizing the business spirit of small companies in Silicon Valley. They have a small software firm in San Jose called Tasvir, which is operated by the parent company in Sweden, with a small group of enthusiastic Americans who are working on some new ideas that so far remain secret.

Elektronikgruppen i Lund (EGIL) is an association of 16 small electronics companies. But they are dependent on Silicon Valley for components for their products. They often do not even know whether or not the components they need exist.

For this reason, they have been working 1 year with the technical attache's office in Los Angeles. EGIL pays half the salary of Bengt Levin at the attache's office. He monitors events in Silicon Valley on their behalf.

"I work primarily to obtain products and licenses for EGIL," he said. "It is possible, however, that EGIL might someday sell its products here."

This work for EGIL has worked so well that electronics companies in Goteborg have discussed the possibility of joining together for continuous monitoring of Silicon Valley. In October a large industrial delegation from Kista will visit here to study venture capital and the progress of new companies. Their goal is to build their own Silicon Valley back in Kista.

9336
CSO: 3698/92

SWEDISH FIVE-YEAR MICROELECTRONICS PROGRAM ANNOUNCED

Stockholm SVENSKA DAGBLADET in Swedish 25 Oct 83 p IV

[Article by Johan Myrsten]

[Text] The government has presented its proposal for a national microelectronics program. According to the program, the government and the industry would invest a total of 714 million kronor over the next 5 years in the microscopic building blocks of electronics--integrated circuits.

"This is one of the most important industrial policy proposals ever made. Our ministry is extremely pleased to make this proposal," said Industry Minister Thage G. Peterson as he and Education Minister Lena Hjelm-Wallen presented the proposal at a press conference on Monday.

The main purpose of the program is to support education, research, development, and the production of made-to-order circuits in Sweden. The government does not believe, however, that Sweden has a chance to compete in the area of standard circuits (microprocessers, memory, etc.) which are mass-produced, primarily in the United States and Japan.

"Our ability to develop and produce microelectronic components is of decisive strategic significance for our position as a top-ranking industrial nation. As the trend turns from standard circuits to custom-made circuits, we will have a chance to close some of the gap between us and the United States and Japan," said Thage Peterson.

At present, 80 percent of all circuits are standard circuits, but by about 1990 the custom-made and special components are expected to increase from 20 percent to about 50 percent.

According to the 5-year program, the government will invest 549 million and industry will invest 165 million kronor, beginning immediately after parliament gives its approval. The government's contribution includes 254 million already allocated for goal-oriented research (through the Board for Technological Development, STU).

Of the total amount, 330 million will go toward industrial development and

the rest will be used for education, basic research, and goal-oriented research. Half the industrial support will be paid by the industry itself. Eight detailed projects have been proposed for this money.

These investments were considered necessary primarily because of Sweden's heavy dependence on imports. About 90 percent of all circuits used in Sweden are purchased abroad. There are only two major circuit producers in Sweden--Asea-owned Hafo and Ericsson-owned Rifa. The proposed industrial subsidies are justified by three points in the government's proposal:

The competitors of Swedish industry generally receive government support.

Rapid technological development often makes the necessary investments "unrealistic from a business standpoint, but necessary from the standpoint of the national economy."

A "more restrictive trade situation throughout the world could justify the early acquisition of critical equipment." The industry minister said he was "disturbed by the trend in other countries to limit the export of strategic components."

Industry Criticism

The government's proposal has received much support, but it also has been criticized by the industry's organization, the Swedish Association of Electronics Industries.

Criticism by the association (which has 250 member companies, although Asea-Hafo and Rifa are not members) is directed primarily at support to industry. The association believes that the limited resources available in Sweden should be used instead to support the procurement of finished systems--not components that can be purchased cheaper on the world market.

Other European countries that have invested in microelectronics programs have lost ground to the competition in other areas of data technology, according to Hasse Samuelsson, director of the association.

"Sweden has been successful not in producing components, but by using them in a clever manner," Hasse Samuelsson said.

9336
CSO: 3698/92

BRIEFS

CIT ALCATEL SHOWS LOSSES--The publication of the CIT Alcatel report discloses that all the subsidiaries of this company have experienced losses in 1982 (as in fact, have the subsidiaries of Thomson-CSF and Matra). Mars Alcatel for instance, has had a loss of 3.4 MF (million francs) with a turnover of 130 MF; Quartz Electronique lost 39,000 F with a turnover of 43.5 MF; and Semiconducteurs Alcatel recorded 1.5 MF in the red with a turnover of 1.1 MF. In addition, the report provides general information on the activities of the company's Components Branch: "The Components Branch, which combines the Coutance printed circuit plant, the Arcueil hybrid circuit plant, and the integrated circuit design unit created in 1982, has essentially devoted itself, according to its major objective, to meeting the internal needs of the Switching and Transmission Departments of CIT Alcatel. Nevertheless, with foreign customers it has achieved a turnover of 38 MF and recorded 40 MF in orders. These foreign sales represent less than one-third of its total activity. In the Components Branch, the major investments (20.8 MF of commitments) were made in the integrated circuit design unit (independent of Semiconducteurs Alcatel) so as to enable it to fulfill its development program. The other expenses were intended to improve production quality and productivity at the Arcueil hybrid circuit plant and at the Coutances printed circuit unit." [Text] [Paris ELECTRONIQUE ACTUALITES in French 28 Oct 83 p 15] 11,023

COMPONENT-MANUFACTURING EQUIPMENT--Paris--Matra and the American company GCA, world leader in integrated-circuit manufacturing machines with 60 percent of the market, have reached an agreement for the joint production and sales of equipment for component manufacturing, according to a statement from the French company on 31 October, in Paris. This agreement, which is only valid for Europe and which was prepared in 1982, has resulted in the creation of a joint company named Matra GCA SA, whose capital is held equally by the two partners. It will employ some one hundred people at first, at is headquarters in Malville (near Nantes). Its turnover will be over 100 million francs in 1985. The joint company will combine the activities of Euromask, a Matra subsidiary created in 1981, which has achieved a turnover of 5.1 million francs in 1982, and the semiconductor equipment activities of GCA International in Kreuzlingen (Switzerland). Matra GCA SA, the first of whose jointly manufactured products will be introduced at the end of 1984, is directed by Mr Bernard Quancard. [Text] [Paris AFP SCIENCES in French 3 Nov 83 p 23] 11,023

SCIENTIFIC AND INDUSTRIAL POLICY

FRG FIRM OFFERS COUNSELING, VENTURE CAPITAL TO BEGINNERS

Essen ELEKTRONIK-APPLIKATION in German Jun 83 pp 10-12

[Article by K. K.: "Venture Capital: New in Germany"]

[Text] Already in their first development phase many young enterprises are getting into difficulties. Most of the time the causes are avoidable errors, says Dr Klaus Nathusius, principal member of the management of Genes, Inc. He and his team are holding out to beginners promising initial assistance through founder counseling, through financing with venture capital and through licensing.

Anyone who becomes independent and establishes an enterprise generally takes such a step only once in his life. Seen this way it is no wonder that he is ill-prepared for the questions which this involves such as, for example, the problem of building one's own organization, the problem of financing and the problem of product marketing. It is hardly likely that he will already have learned something about this because in the FRG there are no advanced schools or specialized schools offering a course on the subject of "How Do I Establish a Business?"

The Complete Planning of an Enterprise in Advance of Its Founding

How does Genes, Inc, go about founder counseling? Dr Nathusius reports: For example, on the recommendation of his bank an interested person telephones us. A counseling contract is completed and the conversation begins. First, there is a discussion of the founding design. A joint effort is made to establish the deficiencies of this design, to recognize inadequacies and determine what may be done to eliminate them. In this way a complete enterprise plan is built up step by step, usually for a period of 3 years. In this process the first year is planned in very great detail but the subsequent one only in relatively rough outline.

The next step involves finding the suitable financial structure for the young firm. An important feature of this stage is the fact that for almost all initial enterprises there exist at the present time up to three public support programs. Further important considerations relate to the point at which entrance into the market should take place and also relate to questions as to which marketing techniques should be employed and as to how the firm should present itself to the public from the moment when it first opens its doors.

Taken all in all this is a well-rounded complete program. The Genes Company, Inc, represents the specialists called in to develop an enterprise; in other words it practically represents midwives. But it is not purely a question of avoiding mistakes in the first phase. For this reason the counseling in many cases is continued--for approximately 2 or 3 years.

New in Germany: Venture Capital

Another Genes domain relates to venture capital. By this we mean coresponsible participatory enterprise capital in young fast-growing enterprises. This capital is made available because the capitalizers believe that in view of the growth potentiality of the young firm they will be able to disengage themselves after a few years and depart from the company with a good profit. The model for this originated in the United States. There there exist about 600 venture capital companies which at the present time have invested about $6 billion in young enterprises. This capital derives in part from big banks and insurance companies, but also from private groups. It is an interesting fact that almost all of the electronics enterprises founded in the United States in the last 15 years have been financed in their initial phase by venture capital.

It is well known that there exists a distinct lack of proprietor's capital in German industry. This fact falls with particular weight upon young fast-growing enterprises. For them the risks are abnormally high so that it is necessary to use reserves from their capital structure which actually should consist of their own proprietor's capital. Because outside capital must be served with interest, which normally creates difficulties for young growing enterprises.

Genes enters this gap in the market with an offer of venture capital. The investors of the funding set up for this purpose are for the most part foreign companies: banks, insurance companies and industrial enterprises. Because financing with venture capital is something entirely new in Germany. A normal investment is of an order of magnitude ranging from 500,000 DM to 1 million DM. The businesses involved are only initially founded enterprises and young "small-business" enterprises. In cases requiring substantially more participatory capital it is possible in Europe to arrange coinvestments with the aid of other venture capital funds.

License Brokerage in Both Directions

In the sector of license brokerage one has this picture: the interested firms approach Genes with the announcement that they wish to enter new domains and are looking for new products. In many of these firms an analysis has already been worked up ahead of time to determine the areas in which the firms would like to be active in the future. Then they say to Genes: "These are the search areas--help us to find corresponding products or processes for these domains.

Genes, Inc, has the international contacts necessary for such commitments. Thus it is, for example, the German representative of the U.S. firm Dr Dvorkovitz and Associates in Ormond Beach, Florida, which controls the largest

license data bank in the world involving about 40,000 products and processes. In addition, Genes is a member of the International Licensing Network, a worldwide organization of license brokers having headquarters in New York and through which license searches are passed along.

Through these routes Genes sets up the connections--both for the exploitation of foreign licenses on our part and also conversely. Dr Nathusius gives an example of this: An enterprise in Siegerland has developed a very interesting product which is to be exhibited at the Hanover Fair. The enterprise is small and it is known to be impossible for it to cover the world market out of its own resources. What one needs and desires in this case is a license market in America. Genes is negotiating at the present time with some American companies which want to take over the Siegerland product in order to manufacture it and bring it on the market in their own country and in Canada.

8008
CSO: 3698/111

END

END OF FICHE DATE FILMED

DEC 22, 1983